

## B. PHARMACY

### Syllabus ♦ Semester-8

**Elective subject-10** name with code: **13PH0812 Dietary Supplements and Nutraceuticals**

#### Course Objective

This subject covers a foundational topic that is important for understanding the need and requirements of dietary supplements among different groups in the population.

#### Course Outcomes

This module aims to provide an understanding of the concepts behind the theoretical applications of dietary supplements. By the end of the course, students should be able to:

1. Understand the need for supplements by the different groups of people to maintain a healthy life.
2. Understand the outcome of deficiencies in dietary supplements.
3. Appreciate the components in dietary supplements and their application.
4. Appreciate the regulatory and commercial aspects of dietary supplements including health claims.

#### Teaching and assessment scheme

Teaching Scheme (Hours)			Credits	Theory/ Tutorial Marks			Practical Marks		Total Marks
Theory	Tutorial	Practical		CSE	IA (I)	ESE (E)	TW	Viva (V)	
3	1	0	4	10	15	75	0	0	100

#### Theory syllabus

**Teaching hours: 45 Hours**

##### Unit-1

**7 Hours**

**Nutraceuticals:** Definitions of Functional Foods, Nutraceuticals and Dietary supplements. Classification of Nutraceuticals, Health problems and diseases that can be prevented or cured by Nutraceuticals i.e., weight control, diabetes, cancer, heart disease, stress, osteoarthritis, hypertension etc. Public health nutrition, maternal and child nutrition, nutrition and ageing, nutrition education in the community. Source, Name of marker compounds and their chemical nature, Medicinal uses and health benefits of following used as nutraceuticals/functional foods: Spirulina, Soyabean, Ginseng, Garlic, Broccoli, Gingko, Flaxseeds.

##### Unit-2

**15 Hours**

**Phytochemicals as nutraceuticals:** Occurrence and characteristic features (chemical nature medicinal benefits) of following a) Carotenoids-  $\alpha$  and  $\beta$ -Carotene, Lycopene, Xanthophylls, leutin b) Sulfides: Diallyl sulfides, Allyl trisulfide. c) Polyphenolics: Resveratrol d) Flavonoids- Rutin, Naringin, Quercetin, Anthocyanidins, catechins, Flavones e) Prebiotics / Probiotics: Fructo-oligosaccharides, Lactobacillus f) Phytoestrogens: Isoflavones, daidzein, Geobustin, lignans g) Tocopherols h) Proteins, vitamins, minerals, cereal, vegetables and beverages as functional foods: oats, wheat bran, rice bran, seafood, coffee, tea and the like.

##### Unit-3

**7 Hours**

**Introduction to free radicals:** Free radicals, reactive oxygen species, production of free radicals in cells, damaging reactions of free radicals on lipids, proteins, carbohydrates, nucleic acids. b) Dietary fibres and complex carbohydrates as functional food ingredients.

##### Unit-4

**10 Hours**

**Diseases:** a) Free radicals in Diabetes mellitus, Inflammation, Ischemic reperfusion injury, Cancer, Atherosclerosis, Free radicals in brain metabolism and pathology, kidney damage, muscle damage. Free radicals' involvement in other disorders. Free radicals' theory of ageing. b) Antioxidants: Endogenous antioxidants - enzymatic and nonenzymatic antioxidant defence, Superoxide dismutase, Catalase, Glutathione peroxidase, Glutathione Vitamin C, Vitamin E,  $\alpha$ - Lipoic acid, melatonin Synthetic antioxidants: Butylated hydroxy Toluene, Butylated hydroxy Anisole. c) Functional foods for chronic disease prevention.

##### Unit-5

**6 Hours**

**Environmental factors:** Effect of processing, storage and interactions of various environmental factors on the potential of nutraceuticals. b) Regulatory Aspects; FSSAI, FDA, FPO, MPO, AGMARK. HACCP and

GMPs on Food Safety. Adulteration of foods. c) Pharmacopeial Specifications for dietary supplements and nutraceuticals.

**Tutorials will be based on the above syllabus.**

**Teaching hours: 15 Hours**

**Recommended references (Latest edition)**

1. Dietetics by Sri Lakshmi.
2. Role of dietary fibres and nutraceuticals in preventing diseases by K.T Agusti and P. Faizal: BS Publication.
3. Advanced Nutritional Therapies by Cooper. K.A., (1996).
4. The Food Pharmacy by Jean Carper, Simon & Schuster, UK Ltd., (1988).
5. Prescription for Nutritional Healing by James F. Balch and Phyllis A. Balch 2nd Ed., Avery Publishing Group, NY (1997).
6. G. Gibson and C. Williams Editors 2000 Functional foods Woodhead Publ. Co. London.
7. Goldberg, I. Functional Foods. 1994. Chapman and Hall, New York.
8. Labuza, T.P. 2000 Functional Foods and Dietary Supplements: Safety, Good Manufacturing Practice (GMPs) and Shelf-Life Testing in Essentials of Functional Foods M.K. Sachmidl and T.P. Labuza eds. Aspen Press.
9. Handbook of Nutraceuticals and Functional Foods, Third Edition (Modern Nutrition).
10. Shils, ME, Olson, JA, Shike, M. 1994 Modern Nutrition in Health and Disease. Eighth edition. Lea and Febiger.